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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,687	03/18/2004	Dave Weber	81091558 / FCHM 0155 PUS	2686
28395 7590 05/03/2007 BROOKS KUSHMAN P.C./FGTL 1000 TOWN CENTER 22ND FLOOR SOUTHFIELD, MI 48075-1238			EXAMINER CAMPANELLO, FRANCIS C	
			ART UNIT 1709	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/708,687

Applicant(s)

WEBER, DAVE

Examiner

Frank C. Campanell

Art Unit

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-21, and 23-29 is/are rejected.
- 7) ☒ Claim(s) 6, 7 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03/18/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 04/01/2004 and 0318/2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

Detailed Action

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1,2,4,13,14,24,25, and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Lynch (US 4163042).

Regarding claim 1, Lynch teaches a combustion exhaust catalyst support adapted to hold an exhaust catalyst in an exhaust system, the support comprising: a flexible refractory mat having a first surface and a second surface, the flexible refractory mat adapted to surround the exhaust catalyst with the first surface being adjacent to a surface of the exhaust catalyst; and a metal foil having a plurality of protrusions, the metal foil disposed over the second surface of the flexible refractory mat. (Figure 3, and column 4 lines 22-37. In the figure #8 is the refractory mat, and #9 is the metal foil)

Regarding claim 2, Lynch teaches the support of claim 1 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the

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metal foil is corrugated. (Figure 3, and column 4 lines 5-10. In the figure 9 is the metal foil)

Regarding claim 4, Lynch teaches the support of claim 1 wherein the metal foil comprises a metal selected from the group consisting of stainless steels, nickel alloys, and cobalt alloys. (column 4 lines 10-15)

Regarding claim 13, Lynch teaches an exhaust system comprising: an exhaust catalyst; a flexible refractory mat having a first surface and a second surface, the flexible refractory mat surrounding the exhaust catalyst with the first surface being adjacent to a surface of the exhaust catalyst; and a metal foil having a plurality of protrusions, the metal foil disposed over the second surface of the flexible refractory mat. (Figure 3, and column 4 lines 22-35. In the figure #8 is the refractory mat, and #9 is the metal foil)

Regarding claim 14, Lynch teaches the exhaust system of claim 13 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the metal foil is corrugated. (Figure 3, and column 4 lines 5-10. In the figure #9 is the metal foil)

Regarding claim 20, Lynch teaches the exhaust system of claim 13 wherein the metal foil comprises a metal selected from the group consisting of stainless steels, nickel alloys, and cobalt alloys. (column 4 lines 10-15)

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Regarding claim 24, Lynch teaches a method of supporting an exhaust catalyst, the method comprising: placing a flexible refractory mat having a first surface and a second surface over a surface of an exhaust catalyst wherein the first surface is adjacent to the surface of the exhaust catalyst; placing a metal foil having a plurality of protrusions over the second surface of the refractory mat to form a catalyst-support combination; and securely placing catalyst-support combination within a metal tube, the metal tube adapted to be placed within an exhaust system. (Figure 3, and column 4 lines 22-35. In the figure 8 is the refractory mat, and 9 is the metal foil. Figure one shows the adaptation to be placed in an exhaust system and see column 4 line 47-column 5 line 10)

Regarding claim 25, Lynch teaches the method of claim 24 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the metal foil is corrugated. (Figure 3, and column 4 lines 5-10. In the figure 9 is the metal foil)

Regarding claim 27, Lynch teaches the method of claim 24 wherein the catalyst-support combination is placed with a metal tube by sliding the catalyst-support combination in the metal tube and then swaging down on the metal tube until the catalyst-support combination is held in place. (column 4, lines 5-10)

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teaches the support is to be anchored to the metal tube with swag points. See also column 3 lines 10-20)

Regarding claim 28, Lynch teaches the method of claim 24 wherein the metal tube have a pair of flanges and the catalyst-support combination is placed with a metal tube positioning the catalyst-support combination in the metal tube, compressing the metal tube so that the pair of flanges come in contact, and sealing the pair of flanges together. Figure 2 #4 shows a lock seam. This seam is interpreted to cause the flanges that compose the seam to be fitted together by pressure exerted by the shroud #9 and the compressible cushioning layer of refractory material #8.

Regarding claim 29, Lynch teaches the method of claim 24 wherein the metal tube comprises a first tube half and a second tube half so that the catalyst-support combination is placed in the metal tube by positioning the catalyst-support combination in a cavity formed by bringing the first tube half and the second tube half together. (see column 4 line 47-column 5 line 10)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 3, 15, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lynch (US 4163042) as applied above, and further in view of Foster et al. (PG. PUB 2002/0127154 1A).

Regarding claim 3, Lynch teaches the support of claim 1 wherein the plurality of protrusions exists. Lynch does not teach the plurality of protrusions comprising a plurality of dimples. (Figure 3, and column 4 lines 22-35. In the figure 9 is the metal foil that has a plurality of protrusions.) Foster et al., which is analogous art concerning the making of an emissions control device using a mat, teaches the use of dimples. Foster et al does not teach the use of a metal foil, only the use of a mat with dimples to cause friction between the casing and the mat. (Page 4, paragraphs 0041 and 0042) It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to

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increase the coefficient of friction of the metal foil to the mat and the outer shell.

Foster et al teaches that the use of dimples will increase the coefficient of friction (Page 4, paragraphs 0041) between the mat and the substrate, and between the mat and the outer shell. The increased coefficient of friction is intended to keep the substrate, (which is intended to house the catalyst), mat, and shell together.

Regarding claim 15, Lynch teaches the exhaust system of claim 13 wherein the plurality of protrusions exists. Lynch does not teach the plurality of protrusions comprising a plurality of dimples. (Figure 3, and column 4 lines 22-35. In the figure 9 is the metal foil that has a plurality of protrusions.) Foster et al., which is analogous art concerning the making of an emissions control device using a mat, teaches the use of dimples to cause friction between the casing and the mat. Foster et al does not teach the use of a metal foil, only the use of a mat. (Page 4, paragraphs 0041 and 0042) It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to increase the coefficient of friction of the metal foil to the mat and the outer shell. Foster et al teaches that the use of dimples will increase the coefficient of friction (Page 4, paragraphs 0041) between the mat and the substrate, and between the mat and the outer shell. The increased coefficient of friction is intended to keep the substrate, (which is intended to house the catalyst), mat, and shell together.

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Regarding claim 26, Lynch teaches the method of claim 24 wherein the plurality of protrusions exists. Lynch does not teach the plurality of protrusions comprising a plurality of dimples. (Figure 3, and column 4 lines 22-35. In the figure 9 is the metal foil that has a plurality of protrusions.) Foster et al., which is analogous art concerning the making of an emissions control device using a mat, teaches the use of dimples to cause friction between the casing and the mat. Foster et al does not teach the use of a metal foil, only the use of a mat. (Page 4, paragraphs 0041 and 0042) It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to increase the coefficient of friction of the metal foil to the mat and the outer shell. Foster et al teaches that the use of dimples will increase the coefficient of friction (Page 4, paragraphs 0041) between the mat and the substrate, and between the mat and the outer shell. The increased coefficient of friction is intended to keep the substrate, (which is intended to house the catalyst), mat, and shell together.

6. Claims 8-11, 12, 16-19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lynch (US 4163042) as applied above, and further in view of Stroom et al. (US 6245301).

Regarding claim 8, Lynch teaches the support of claim 1. (Figure 3, and column 4 lines 22-37. In the figure 8 is the refractory mat, and 9 is the metal foil)

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Lynch does not teach the refractory mat comprising refractory ceramic fiber and a binder. Stroom teaches a refractory mat comprising refractory ceramic fiber and a binder. (Fig 6, column 5 lines 50-67) Stroom is analogous art which teaches a catalytic converter wrapped in a ceramic mat for thermal insulation (column 6, lines 17-27). Stroom does not teach the use of a metal foil layer around the ceramic mat. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to make the mat taught in Lynch of ceramic fiber, as taught by Stroom. The motivation to make the mat taught by Lynch ceramic fiber with a binder would be to instill superior thermal protection qualities as taught by Stroom (column 6, lines 17-27 and column 1 lines 45-65.)

Regarding claim 9, Lynch teaches the support of claim 1 wherein the refractory mat is adapted to surround an exhaust catalyst comprising a refractory brick having a longitudinal axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface. (Figures 2,3 and 4 and Column 3, lines 59-65 and Column 4, lines 1-35) Lynch does not teach the refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick. Stroom teaches a refractory mat adapted to surround an exhaust catalyst comprising a refractory brick having a longitudinal

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axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface. The refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick. (Figure 7 # 84 are the honeycombed gas flow channels parallel to the longitudinal axis which pass through the refractory brick.) Stroom does not teach the support of claim one. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to improve the refractory brick taught by Lynch to the improved refractory brick with honeycombed gas flow channels taught by Stroom to utilize the superior gas flow and surface area to weight ratio of the honeycombed channels.

Regarding claim 10, the support of claim 9 is taught by Lynch and Stroom as given under claim 9 rejection, (see directly above). Lynch teaches the first surface of the refractory mat being adjacent to the surface substantially parallel to the longitudinal axis. (Figure 3, In the figure #8 is the refractory mat substantially parallel to the longitudinal axis)

Regarding claim 11, the support of claim 10 is taught by Lynch and Stroom as seen under claims 10 rejection. (see directly above.) Lynch teaches the refractory brick having a substantially circular or substantially elliptical cross-

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section. (Figure 3, in the figure #6 is the refractory brick having a substantially circular or substantially elliptical cross-section. See also column 3 lines 59-64)

Regarding claim 12, Lynch teaches the support of claim 1. (Figure 3, and column 4 lines 22-37. In the figure 8 is the refractory mat, and 9 is the metal foil) Lynch does not teach the metal foil includes a first end with a metal foil notch and a second end with a metal foil protrusion and the refractory mat includes a first end with a refractory mat notch and a second end with a refractory mat protrusion wherein the metal foil notch and metal foil protrusion are adapted to mate together and the refractory mat notch and refractory mat protrusion are adapted to mate together so that the support when placed around the exhaust catalyst is held in place. Stroom teaches a refractory mat with two protrusions adapted to mate together so that the support when placed around the exhaust catalyst is held in place. (See figure 6) Stroom does not teach the use of a metal foil layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to make the refractory mat (taught by both Stroom and Lynch) and the metal foil layer (taught by Lynch) both have two protrusions adapted to mate together so that the support when placed around the exhaust catalyst is held in tightly in place. This reason to use notches for this purpose is explicitly taught by Stroom column 4, lines 41-55.

Regarding claim 16, Lynch teaches the exhaust system of claim 13 wherein the refractory mat is adapted to surround an exhaust catalyst comprising a refractory brick having a longitudinal axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface. (Figures 2,3 and 4 Column 3, lines 59-65 and Column 4, lines 1-35) Lynch does not teach the refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick. Stroom teaches a refractory mat adapted to surround an exhaust catalyst comprising a refractory brick having a longitudinal axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface. The refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick. (Figure 7 # 84 are the honeycombed gas flow channels parallel to the longitudinal axis which pass through the refractory brick.) Stroom does not teach the exhaust system of claim 13. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to improve the refractory brick taught by Lynch to the improved refractory brick with honeycombed gas flow channels taught by Stroom to utilize the superior gas flow and surface area to weight ratio of the honeycombed channels.

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Regarding claim 17, The exhaust system of claim 16 is taught by Lynch and Stroom as given under claim 16 rejection, (see directly above). Lynch teaches the first surface of the refractory mat being adjacent to the surface substantially parallel to the longitudinal axis. (Figure 3, In the figure #8 is the refractory mat substantially parallel to the longitudinal axis)

Regarding claim 18, the exhaust system of claim 17 by Lynch and Stroom as seem under claims 17 rejection. (see directly above.) Lynch teaches the refractory brick having a substantially circular or substantially elliptical cross-section. (Figure 3, in the figure #6 is the refractory brick having a substantially circular or substantially elliptical cross-section. See also column 3 lines 59-64)

Regarding claim 19, Lynch teaches the exhaust system of claim 13. Figure 3, and column 4 lines 22-37. In the figure 8 is the refractory mat, and 9 is the metal foil) Lynch does not teach the metal foil includes a first end with a metal foil notch and a second end with a metal foil protrusion and the refractory mat includes a first end with a refractory mat notch and a second end with a refractory mat protrusion wherein the metal foil notch and metal foil protrusion are adapted to mate together and the refractory mat notch and refractory mat protrusion are adapted to mate together so that the support when placed around the exhaust catalyst is held in place. Stroom teaches a refractory mat with two protrusions

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adapted to mate together so that the support when placed around the exhaust catalyst is held in place. (See figure 6) Stroom does not teach the use of a metal foil layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to make the refractory mat (taught by both Stroom and Lynch) and the metal foil layer (taught by Lynch) both have two protrusions adapted to mate together so that the support when placed around the exhaust catalyst is held in tightly in place. This reason to use notches for this purpose is explicitly taught by Stroom column 4, lines 41-55.

Regarding claim 23, Lynch teaches the exhaust system of claim 13. (Figure 3, and column 4 lines 22-37. In the figure 8 is the refractory mat, and 9 is the metal foil) Lynch does not teach the refractory mat comprising refractory ceramic fiber and a binder. Stroom teaches a refractory mat comprising refractory ceramic fiber and a binder. (Fig 6, column 5 lines 50-67) Stroom is analogous art which teaches a catalytic converter wrapped in a ceramic mat for thermal insulation (column 6, lines 17-27). Stroom does not teach the use of a metal foil layer around the ceramic mat. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the two teachings to make the mat taught in Lynch of ceramic fiber, as taught by Stroom. The motivation to make the mat taught by Lynch ceramic fiber with a binder would be to instill superior thermal

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protection qualities as taught by Stroom (column 6, lines 17-27 and column 1 lines 45-65.)

7. Claims 5 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Lynch (US 4163042).

Regarding claim 5, Lynch teaches the support of claim 4 wherein the metal foil is stainless steel. (column 4 lines 10-15). Lynch does not teach the metal being selected from the Monels, Hastelloys, Inconels, 300 series stainless steel's, and 400 series stainless steel's. It would have been obvious to one of ordinary skill in the art at the time of the invention to use one of the listed stainless steel types because of their common usage in the art. The listed stainless steels provide for a wide range of properties of highlighted importance. Since no particular property of stainless steel is critical to the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention to use any stainless steel common in the art.

Regarding claim 21, Lynch teaches the exhaust system of claim 16 wherein the metal foil is stainless steel. (column 4 lines 10-15). Lynch does not teach the metal being selected from the Monels, Hastelloys, Inconels, 300 series stainless steel's, and 400 series stainless steel's. It would have been obvious to one of ordinary skill in the art at the time of the invention to use one of the listed stainless

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steel types because of their common usage in the art. The listed stainless steels provide for a wide range of properties of highlighted importance. Since no particular property of stainless steel is critical to the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention to use any stainless steel common in the art.

Allowable Subject Matter

Claims 6, 7, and 22 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 6, The support of claim 1 (where the metal foil is outside the refractory mat) wherein the metal foil is between about 0.01 millimeters to about 0.5 millimeters is not found in the prior art.

Regarding claim 7, the support of claim 1 (where the metal foil is outside the refractory mat) wherein the metal foil is between about 0.01 millimeters to about 0.2 millimeters is not found in the prior art.

Regarding claim 22, The exhaust system of claim 13 wherein the metal foil is between about 0.01 to about 0.5 millimeters thick is not found in the prior art.

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Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 20040191137 A1

US 20040009106 A1

US 20020071791 A1

US 3948611 A

US 6017498 A

US 5514347 A

US 4462812 A

US 3959865 A

US 3715193 A

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank C. Campanell whose telephone number is 571-270-3165. The examiner can normally be reached on Mon-Fri 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FCC


WALTER D. GRIFFIN
SUPERVISORY PATENT EXAMINER